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Claims

[c1] 1. An amplifier, comprising:
a first amplifier stage for producing a control current in response to an input voltage;
a second amplifier stage comprising a first transistor and a second transistor;
said first transistor coupled to receive said control current and operable to produce a control voltage;
said second transistor coupled to receive said control voltage and operable to produce an output current;
and a nonlinear resistive element coupled to said first transistor to add a nonlinear function of said control current to said control voltage.

[c2] 2. The amplifier of claim 1 wherein said nonlinear resistive element comprises a third transistor connected between said first transistor and a reference potential, said third transistor operable to receive said control current and to generate said nonlinear function of said control current.

[c3] 3. The amplifier of claim 2 wherein said third transistor is a MOS transistor biased to operate in a triode mode when said control current is below a predetermined level

and in a saturation mode when said control current is above said predetermined level.

[c4] 4. The amplifier of claim 3 wherein said first, second and third transistors are nMOS transistors.

[c5] 5. The amplifier of claim 3 wherein said first, second and third transistors are pMOS transistors.

[c6] 6. The amplifier of claim 2 wherein said third transistor is a bipolar transistor biased to operate in a saturation mode when said control current is below a predetermined level and in a forward active mode when said control current is above said predetermined level.

[c7] 7. The amplifier of claim 6 wherein said first, second and third transistors are NPN transistors.

[c8] 8. The amplifier of claim 6 wherein said first, second and third transistors are PNP transistors.

[c9] 9. The amplifier of claim 1 further comprising a fourth transistor responsive to said nonlinear function of said control current and operable to increase said output current when said nonlinear function of said control current exceeds a predetermined value.

[c10] 10. The amplifier of claim 9 wherein said fourth transistor is a MOS transistor having a gate connected to said

nonlinear resistive element, a source connected to a reference potential, and a drain connected to said second transistor.

[c11] 11. The amplifier of claim 10 in which said fourth transistor is a MOS transistor.

[c12] 12. The amplifier of claim 10 in which said fourth transistor is a bipolar transistor.

[c13] 13. The amplifier of claim 9 further comprising fifth and sixth transistors responsive to said control voltage and operable to control said fourth transistor while isolating a capacitance of said fourth transistor.

[c14] 14. The amplifier of claim 13 wherein:
said first transistor is a MOS transistor having a drain connected to receive said output current, a gate connected to said drain, and a source,
said nonlinear resistive element comprises a third transistor connected between said source of said first transistor and a reference potential, said third transistor being a MOS transistor constructed to operate in a triode mode when said control current is below a predetermined level and in saturation mode when said control current is above said predetermined level;
said second and fourth transistors are MOS transistors

and said fifth and sixth transistors are MOS transistors having gates connected respectively to gates of said second and third transistors, said fourth transistor having a gate connected to a source of said fifth transistor, and having source and drain in parallel with said third transistor.

[c15] 15. The amplifier of claim 14 wherein said first, second, third, fourth, fifth, and sixth transistors are nMOS transistors.

[c16] 16. The amplifier of claim 14 wherein said first, second, third, fourth, fifth and sixth transistors are pMOS transistors.

[c17] 17. The amplifier of claim 1 further comprising a current source coupled to oppose said output current and so produce an output voltage, and further comprising a MOS output power transistor coupled to receive said output voltage.

[c18] 18. A circuit, comprising:
an amplifier for producing a control current in response to an input voltage and a control voltage in response to said control current;
a circuit for producing an output current in response to said control voltage;

a nonlinear resistive element for adding a voltage that is a nonlinear function of said control current to said control voltage;
and an output stage driven in response to said output current.

[c19] 19. The circuit of claim 18 wherein said nonlinear resistive element is a MOS transistor constructed to operate in triode mode when said control current is below a predetermined level and in saturation mode when said control current is above said predetermined level.

[c20] 20. The circuit of claim 18 wherein said nonlinear resistive element is a bipolar transistor constructed to operate in saturation mode when said control current is below a predetermined level and in forward active mode when said control current is above said predetermined level.

[c21] 21. The circuit of claim 18 further comprising a circuit that is connected in parallel with said circuit for producing an output current when said control current exceeds a predetermined value.

[c22] 22. The circuit of claim 21 further comprising a circuit connected to isolate a capacitance of said circuit that is connected in parallel with said circuit for producing an

output current.

[c23] 23. A method for controlling an output current of a circuit, comprising:
producing a control current in response to an input voltage and a control voltage in response to said control current;
producing an output current in response to said control voltage;
providing a nonlinear resistive element for adding voltage that is a nonlinear function of said control current to said control voltage;
and driving an output stage in response to said output current.

[c24] 24. The method of claim 23 further comprising operating said nonlinear resistive element in a low dynamic resistance mode when said control current is below a predetermined level and in a high dynamic resistance mode when said control current is above said predetermined level.

[c25] 25. The method of claim 23 further comprising providing a parallel path for said output current when said control current exceeds a predetermined value.

[c26] 26. The method of claim 25 further comprising isolating

a capacitance of an element of said parallel path.